## General Fractal Tread Design

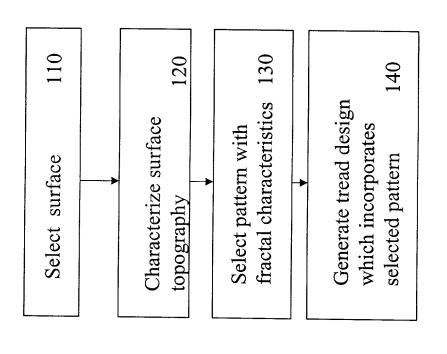
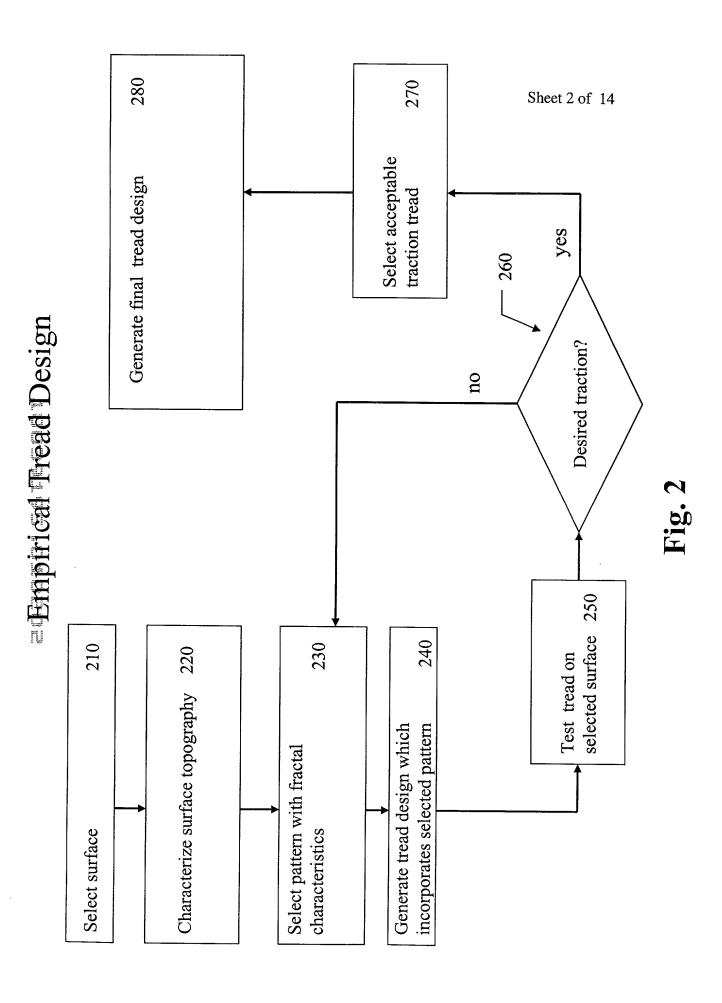


Fig. 1



Empirical Tread Design - substeps of 230 

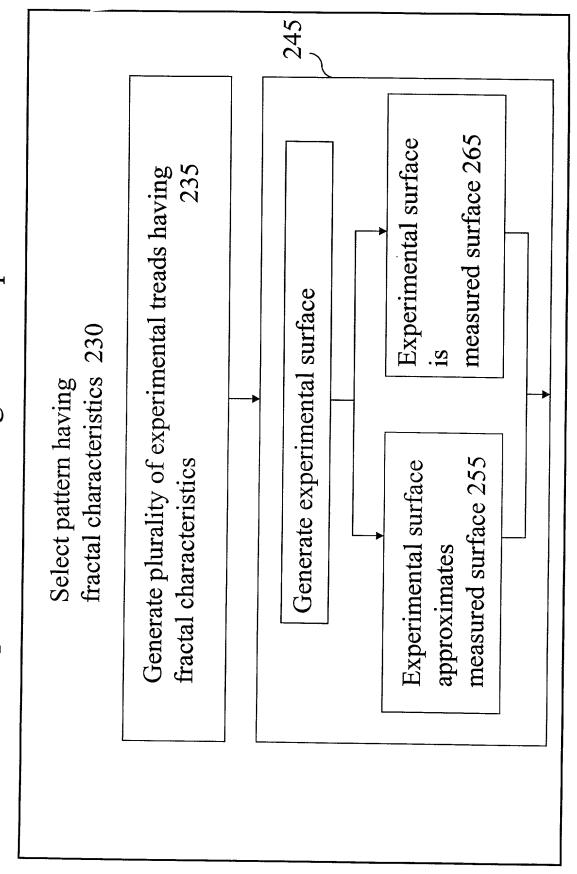


Fig. 2A

## Analytical Tread Design

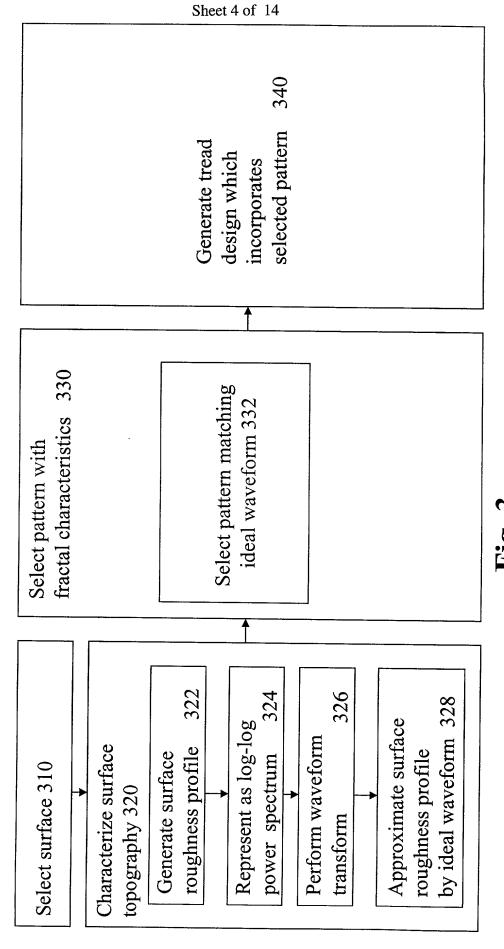


Fig. 3

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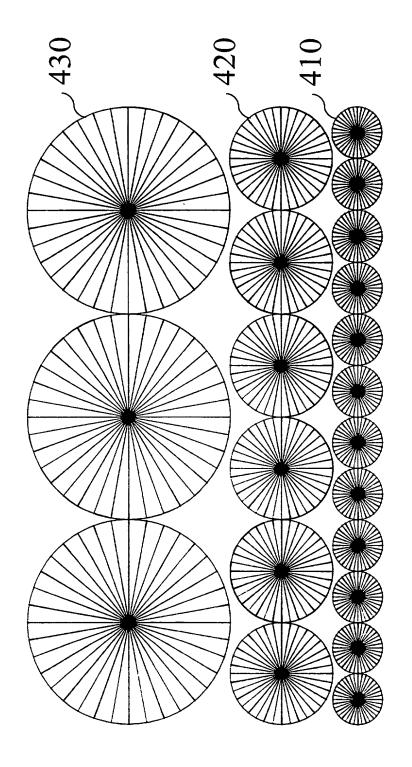
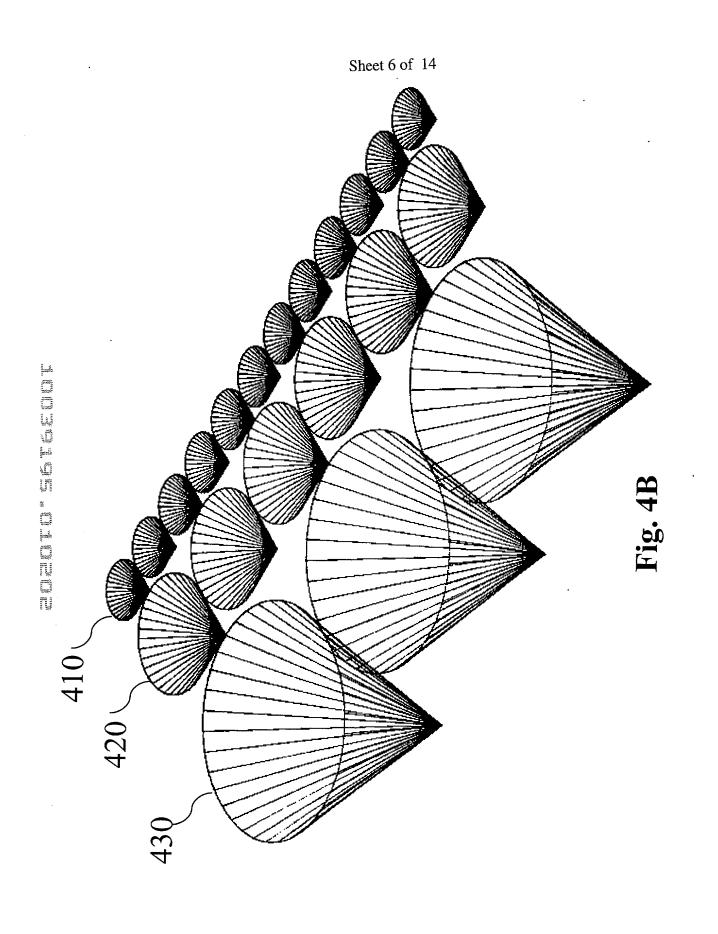


Fig. 4A



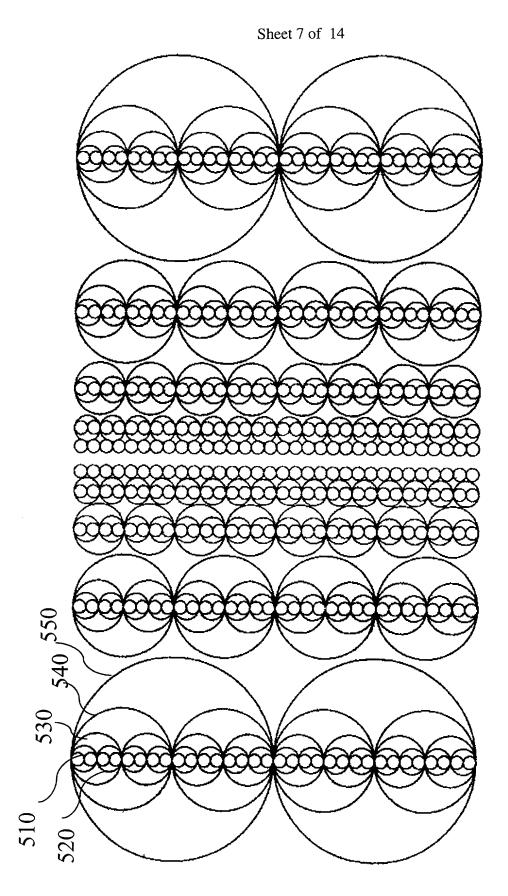
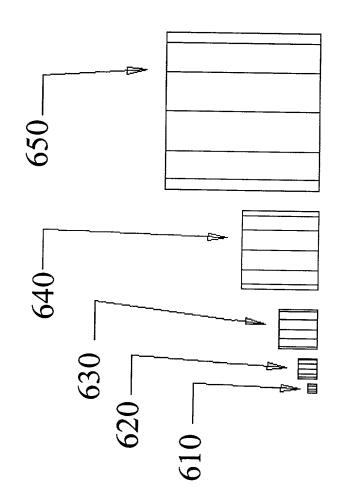


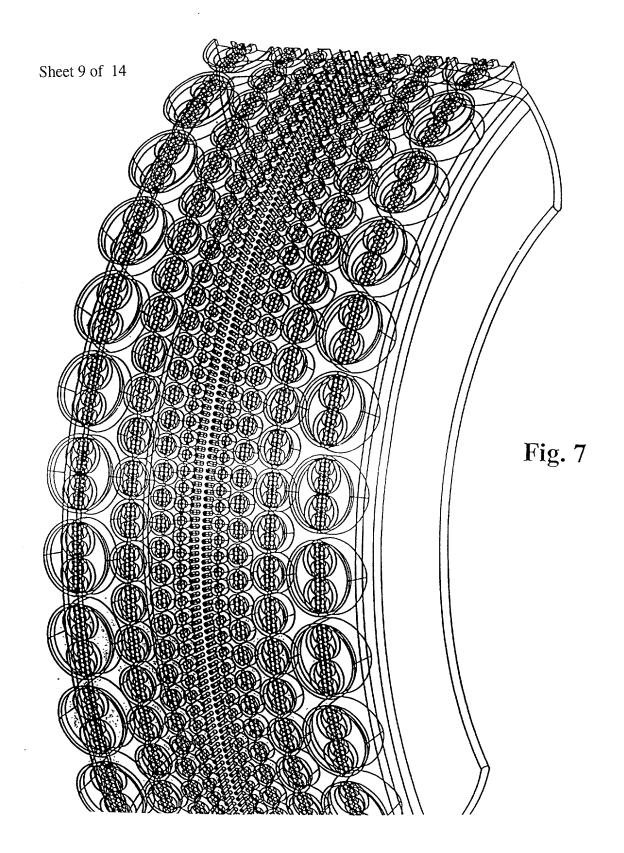
Fig. 5

Cylinders - cross section

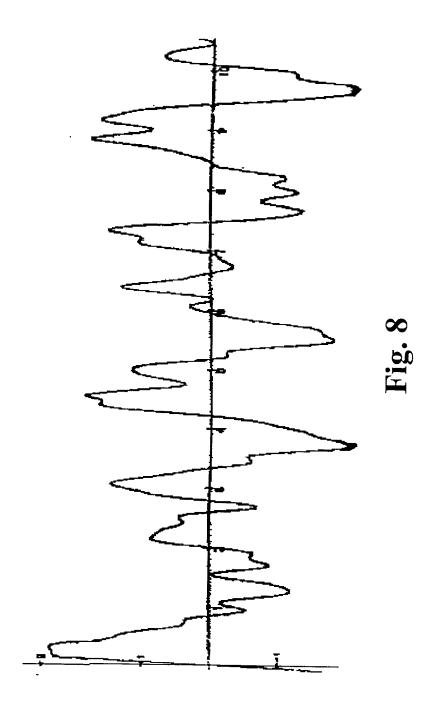


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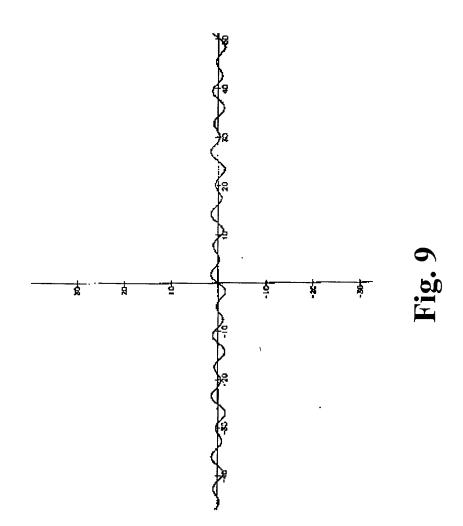
Fig. 6



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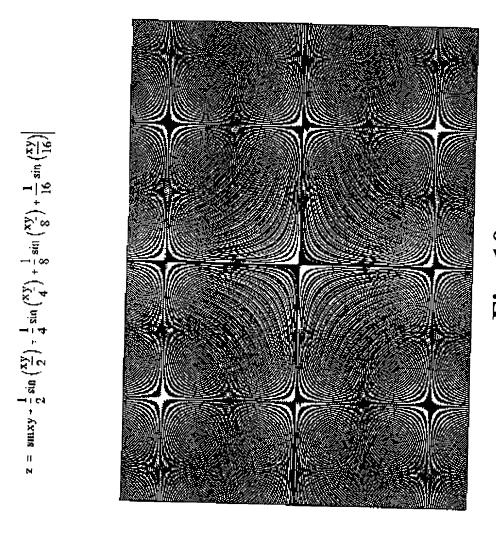


Fig. 10

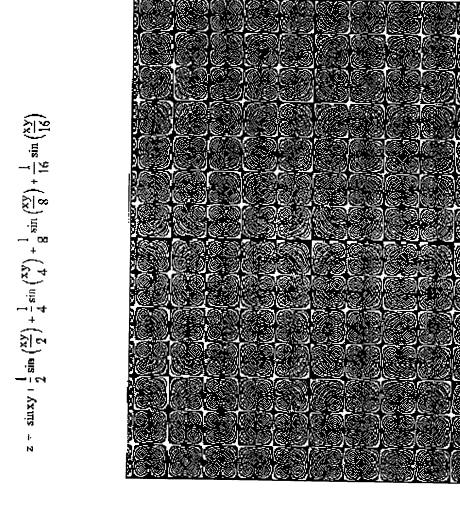


Fig. 11

$$Z = \sin xy + \frac{1}{2}\sin\left(\frac{xy}{2}\right) + \frac{1}{4}\sin\left(\frac{xy}{4}\right) + \frac{1}{8}\sin\left(\frac{xy}{8}\right) + \frac{1}{16}\sin\left(\frac{xy}{16}\right)$$

$$= \sin xy + \frac{1}{2}\sin\left(\frac{xy}{4}\right) + \frac{1}{4}\sin\left(\frac{xy}{4}\right) + \frac{1}{8}\sin\left(\frac{xy}{8}\right) + \frac{1}{16}\sin\left(\frac{xy}{16}\right)$$

$$= \sin xy + \frac{1}{4}\sin\left(\frac{xy}{4}\right) + \frac{1}{4}\sin\left(\frac{xy}{8}\right) + \frac{1}{16}\sin\left(\frac{xy}{16}\right)$$

$$= \sin xy + \frac{1}{4}\sin\left(\frac{xy}{4}\right) + \frac{1}{4}\sin\left(\frac{xy}{8}\right) + \frac{1}{16}\sin\left(\frac{xy}{8}\right)$$

$$= \sin xy + \frac{1}{4}\sin\left(\frac{xy}{8}\right) + \frac{1}{16}\sin\left(\frac{xy}{8}\right) + \frac{1}{16}\sin\left(\frac{xy}{8}\right)$$

$$= \sin xy + \frac{1}{4}\sin\left(\frac{xy}{8}\right) + \frac{1}{16}\sin\left(\frac{xy}{8}\right) + \frac{1}{16}\sin\left(\frac{xy}{8}\right)$$

$$= \sin xy + \frac{1}{16}\sin\left(\frac{xy}{8}\right) + \frac{1}{16}\sin\left(\frac{xy}{8}\right) + \frac{1}{16}\sin\left(\frac{xy}{8}\right)$$

$$= \sin xy + \frac{1}{16}\sin\left(\frac{xy}{8}\right) + \frac{1}{16}\sin\left(\frac{xy}{8}\right) + \frac{1}{16}\sin\left(\frac{xy}{8}\right)$$

$$= \sin xy + \frac{1}{16}\sin\left(\frac{xy}{8}\right) + \frac{1}{16}\sin\left(\frac{xy}{8}\right) + \frac{1}{16}\sin\left(\frac{xy}{8}\right)$$

$$= \sin xy + \frac{1}{16}\sin\left(\frac{xy}{8}\right) + \frac{1}{16}\sin\left(\frac{xy}{8}\right) + \frac{1}{16}\sin\left(\frac{xy}{8}\right) + \frac{1}{16}\sin\left(\frac{xy}{8}\right)$$

$$= \sin xy + \frac{1}{16}\sin\left(\frac{xy}{8}\right) + \frac{1}{16}$$

Fig. 12